

FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

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In the Matter of

Procedures to Govern the Use of  
Satellite Earth Stations on Board  
Vessels in the 5925-6425 MHz/3700-  
4200 MHz Bands and 14.0-14.5  
GHz/11.7-12.2 GHz Bands.

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IB DOCKET No. 02-10

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

TO: THE COMMISSION

NOTICE OF PROPOSED RULE MAKING

SCHLUMBERGER OMNES, INC.

Robert J. Miller  
Gardere Wynne Sewell LLP  
1601 Elm Street, Suite 3000  
Dallas, Texas 75201-4761  
(214) 999- 4219

Its Attorney

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## **SUMMARY**

In the captioned Notice of Proposed Rule Making, the Commission proposes rules to permit the blanket licensing and operation of earth stations on board vessels ("ESVs") in the Ku-band. As detailed in these comments, Schlumberger Omnes, Inc. supports adoption of these rules.

Licensed operation of ESVs would serve the public interest for several reasons. Vessels traveling along the U.S. Inland Waterway System would be able to use state-of-the-art broadband technologies instead of the analog systems currently used. This updated, spectrally-efficient technology would improve vessel safety, enhance early severe weather detection, and support the President's Homeland Security objectives without causing harmful interference to incumbent users.

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**COMMENTS**

In the captioned Notice of Proposed Rule Making ("NPRM"), the Commission proposes rules governing the operation of earth stations on board vessels ("ESVs") for fixed-satellite service ("FSS") networks.<sup>1</sup> One of these proposals is licensing "ESV networks that consist of hub earth stations and ESVs for operation over geostationary satellite orbit (GSO) FSS satellites in the Ku-band."<sup>2</sup> Under this proposal, the Commission "would permit blanket licensing of an ESV network similar to the licensing rules for very small aperture terminals (VSATs) that currently operate in the Ku-band."<sup>3</sup>

Schlumberger Omnes, Inc. ("SOI")<sup>4</sup> supports adoption of the proposed rules. These new rules would promote the Commission's "goals and objectives for market-driven deployment of broadband technologies and efficient spectrum usage."<sup>5</sup>

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<sup>1</sup> The deadline for filing comments on the NPRM is February 23, 2004. 69 FR 3056 (Jan. 22, 2004).

<sup>2</sup> NPRM at ¶5.

<sup>3</sup> *Id.*

<sup>4</sup> SOI is a wholly-owned subsidiary of Schlumberger Limited, a global technology services company. Schlumberger Limited's companies provide services, solutions, and technology resources to the international petroleum industry and to the telecommunications, utility, finance, transport, and public sectors. As part of Schlumberger Limited's international group of technology companies, SOI provides satellite communications services using its licensed earth stations (call signs E000038, E000039, and E010102) and its VSAT network.

<sup>5</sup> NPRM at ¶3.

Specifically, as detailed herein, adoption of the proposed rules would allow vessels (including barges) to replace conventional analog communications systems with state-of-the-art broadband networks, would support the President's Homeland Security initiatives, and would enhance U.S. Coast Guard and Army Corps efforts to improve safe vessel traffic and early severe weather detection on U.S. waterways.

### **SOI'S INTEREST**

SOI is licensed to operate a non-common carrier VSAT network (call sign EO10082). SOI has pending an FCC Form 312 application (the "Application") for a new license to operate a separate non-common carrier VSAT network for ESVs along the U.S. Inland Waterway System (the Mississippi, Ohio, Illinois and Tennessee Rivers) (call Sign E020303, File No. SES-LIC-20021028-01926).<sup>6</sup> In addition, SOI has Special Temporary Authority ("STA") until March 8, 2004, to test a Ku-band fixed VSAT network using 1.2 meter ESVs on two (2) U.S.-flagged vessels traveling along the domestic Inland Waterway System (File No. SES-STA-20020909-01558).<sup>7</sup>

### **SOI'S ESV NETWORK**

SOI proposes operating a much-needed data communications network service between vessels, which travel along the U.S. Inland Waterway System, and their operating centers throughout the country. The ESVs would communicate on specified Ku-band uplink and downlink frequencies via the AMC-4 satellite with SOI's VSAT hub

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<sup>6</sup> The deadline for filing petitions to deny the Application passed with no protests being filed. To support grant of the Application, pursuant to Section 1.3 of the Commission's rules (47 C.F.R. § 1.3 (2004)), SOI also has pending a Petition for Waiver ("Petition") of the Table of Frequency Allocations (47 C.F.R. § 2.106 (2004)). Since VSAT networks only are authorized for fixed services, SOI requested a waiver of the Table of Frequency Allocations so it could provide services to ESVs on mobile U.S.-flagged vessels traveling along the domestic Inland Waterway System.

<sup>7</sup> The Application originally was filed by SOI's predecessor-in-interest, Data Marine Systems, Inc. ("DMS"). In addition, the STA originally was granted to DMS and the Petition originally was filed by DMS.

facility located in Sedalia, Colorado.<sup>8</sup> Data and voice traffic then would be transmitted from the VSAT hub to the vessel operator's operations center(s) throughout the United States via leased terrestrial facilities.

As detailed in the Application and in the Petition, SOI would provide this VSAT service to the vessels strictly on a non-interfering basis. It would accept interference from all authorized Ku-band terrestrial and satellite operators, and it would not cause any interference to such operators. Furthermore, upon notice of such interference by authorized Ku-band users, SOI immediately would cease such operations until the cause of the interference has been eliminated to that user's satisfaction.

SOI would be able to provide its contemplated service without causing any harmful interference to Ku-band terrestrial users because there are no protected fixed service licensees in that band. Since there are no fixed service licensees entitled to protection, SOI does not have to engage in any prior coordination activities.

Similarly, SOI would not interfere with Ku-band space stations. The ESVs would have a pointing accuracy of +/- 0.2 degrees under all operating conditions. SOI would operate a transmit mute that is based on carrier detect at the modem of each ESV. If, for any reason, the ESV antenna loses track of the current satellite, then the ESV modem will lose carrier detect. The carrier detect functionality is connected to the antenna controller. When the controller senses loss of carrier detect, the ESV transmit immediately is de-activated and then is re-activated only when the system acquires the correct satellite. Specifically, the antenna tracking, pointing and control system will

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<sup>8</sup> This hub facility is licensed to SOI's affiliate, Schlumberger Technology Corporation (call sign E7818). In addition, SOI will use its licensed Ku-band earth station located in Houston, Texas, as a back-up hub facility (call sign E000039). In order to have sufficient flexibility as its mobile VSAT operations mature, SOI, in the Application, seeks authority to communicate with all U.S.-licensed satellites ("ALSAT").

cause transmissions to cease if the pointing error exceeds 0.5 degrees and the transmissions will not resume until the pointing error is within 0.2 degrees. Thus, SOI's transmit mute technology automatically and immediately disables ESVs that potentially would communicate with, and cause harmful interference to, the wrong satellites.

Empirical evidence supports SOI's assertion that Ku-band operation of mobile ESVs poses little, if any, threat of harmful interference to other operations. There has been no interference caused by the mobile VSAT under SOI's STA. In addition, neither the satellite licensee nor the vessel operator involved in this test has reported, or has been contacted about, any interference problems. Nor has SOI detected any interference. Moreover, the public interest value of the VSAT technology already is evident. The vessel operator's data and call completion rates increased from 60-80% to 99% during the test period. This new completion rate clearly represents a significant improvement in the vessel operator's communications capabilities. With this high level of reliability, vessel operators will be much better equipped to navigate the U.S. Inland Waterway System safely and to report severe weather conditions or domestic security threats to appropriate public officials.

#### **ADOPTION OF THE PROPOSED RULES IS IN THE PUBLIC INTEREST**

SOI has developed a new mobile services application for VSAT technology. While VSAT is limited to fixed operations, SOI has determined that this technology also can provide interference-free, critical mobile communications capabilities.

Consistent with the Commission's stated objectives in the NPRM,<sup>9</sup> establishing rules for ESV operations in the Ku-band would facilitate deployment of high-speed, state-of-the-art broadband technologies. Allowing vessel operators to utilize ESV

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<sup>9</sup> NPRM at ¶3.

technology would upgrade their communications capabilities significantly. This upgrade then would enable vessel operators to support industry and government efforts for implementing the President's Homeland Security initiatives, for promoting safe vessel traffic on the Inland Waterway System, and for improving early severe weather detection programs.

#### **1. Telecommunications Capabilities Would Be Upgraded**

Currently, vessel operators are equipped with unsophisticated communications systems for meeting safety and business needs. Vessel operators are limited to using conventional bridge-to-bridge VHF radios. These radios must be located within a specified distance from terrestrial facilities. Unfortunately, these systems have limited range, operate at slow speeds, provide minimal capacity, and are vulnerable to network congestion.

Adoption of the proposed rules would improve this situation dramatically. Vessels would be equipped with access to state-of-the-art, high-speed broadband telecommunications networks. Such networks would provide vessel operators more cost-effective and efficient voice and data communications capabilities. Data services, which cannot be provided over current maritime radio vessels, would be accessible. Vessels no longer would lose service due to system congestion, coverage area restrictions, or capacity limitations. Furthermore, spectrum efficiency would be promoted because less bandwidth is required to provide these digital networks than the bandwidth required to provide existing analog transmissions.

#### **2. Homeland Security Initiatives Would Be Supported**

Protection of homeland security is a top priority. In the aftermath of the 9/11 terrorist attacks, the Commission established the FCC Homeland Security Policy



Council ("Homeland Council"). Among the stated objectives for the Homeland Council is:

Assist[ing] the Commission in ensuring that public safety, public health, and other emergency and defense personnel have effective communication services available to them....<sup>10</sup>

Further, Chairman Powell declared that the Commission's policy is to ensure that every effort is made to promote technologies capable of enhancing domestic security:

With the events of September 11<sup>th</sup>, it has become imperative that the communications community come together to determine our role in ensuring homeland security. We must be aggressive in ensuring that our policies maximize the many efforts being made to make our nation safe. We will work with industry to ensure the reliability and security of our nation's communications infrastructure.<sup>11</sup>

ESV network technology would enable vessel operators to support this objective. Indeed, the U.S. Coast Guard already has solicited vessel operator support by asking them to report suspicious activities.

For example, it is essential for security purposes to know immediately if any vessel shipments of ingredients used for terrorist activities (such as fertilizers, which can be an ingredient in explosives) are being made in a questionable manner. Available ESV technology would enable vessel operators to track their vessels on a minute-to-minute basis, instead of getting location reports every few hours with the current radio technology, and would enable vessel operators to alert appropriate government officials

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<sup>10</sup> FCC Homeland Security Policy Council Mission Statement on Homeland Security Policy Council home page, [www.fcc.gov](http://www.fcc.gov). See also Federal Communications Commission Announces Creation of Homeland Security Policy Council, News Release, Nov. 14, 2001. In this News Release, the Commission listed one of its Homeland Council Missions as "ensur[ing] that public safety, health and other emergency and defense personnel have effective communications available to them to assist the public as needed."

<sup>11</sup> FCC Homeland Security Policy Council Mission Statement on Homeland Security Council home page, [www.fcc.gov](http://www.fcc.gov).

of any questionable activities immediately. This same technique can be used to detect drug trafficking or other illegal activities.

### **3. Public Safety Would Be Improved**

Pursuant to Section 151 of the Act, the Commission has a statutory mandate to “promot[e] safety of life and property through the use of ... radio communication.”<sup>12</sup> Consistent with this obligation, the Commission established a Spectrum Policy Task Force to conduct a “systemic evaluation of existing spectrum policies” and to make “recommendations as to possible improvements,” including use of the spectrum to protect public safety.<sup>13</sup> In this Public Notice, the Commission acknowledges that “[p]ublic safety and public service agencies at the federal, state and local levels, as well as critical infrastructure industries, require highly reliable radio-based communications services.”<sup>14</sup> To satisfy this requirement and fulfill its statutory mandate, the Commission wants mechanisms and services developed that

ensure the availability of dependable, interoperable and cost-efficient radio-based and other Communications services among local and state public safety and federal government agencies in their use of spectrum for public safety, law enforcement, homeland security, and critical infrastructure protection.<sup>15</sup>

VSAT technology for ESVs satisfies this requirement.

The immediate need for improving vessel traffic safety is well-established. Citing several vessel-caused accidents resulting in multiple fatalities, former National Transportation Safety Board (“NTSB”) Chairman Jim Hall declared that the chance of

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<sup>12</sup> 47 U.S.C. § 151 (2004).

<sup>13</sup> Spectrum Policy Task Force Seeks Public Comment on Issues Related to Commission’s Spectrum Policies, Public Notice, ET Dkt. No. 02-135 (DA 02-1311, rel. June 6, 2002).

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

such accidents is increasing because "[n]ot only do you have increased vessel traffic, you have larger and larger vessels on our waterways."<sup>16</sup>

Among these accidents are the following events, all which could have been prevented or could have resulted in fewer fatalities and injuries or less extensive property damage if the vessels were equipped with the more sophisticated navigational and/or communications facilities available with VSAT networks:

- 2002 bridge collapse at South Padre Island, Texas, causing eight (8) motorists to die.
- 2002 bridge collapse along I-40 in Oklahoma, causing 14 motorists to die.
- 2001 collision into a bridge causing a toxic gas leak in a densely populated Baton Rouge, Louisiana, suburb.
- 1993 Amtrak derailment in Alabama, causing over 40 fatalities.

Investigations of these incidents and countless other vessel accidents all conclude that inadequate communication capabilities was a significant contributing factor. Concern over this problem was articulated by NTSB Vice President Robert T. Francis in February 2000, when he stated that "[b]ridge resource management techniques and effective ship-to-ship communications are enormously important tools to enhance safety in maritime operations."<sup>17</sup>

The U.S. Army Corps and U.S. Coast Guard publish information concerning up-to-the-minute waterway conditions (e.g., malfunctioning lights, weather patterns, river gauge data, missing dykes and buoys) that must be carried on all vessels. This information is available via e-mail or web site link, but existing vessel radio systems do

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<sup>16</sup> The Virginian-Pilot, May 31, 2002 (p. B2).

<sup>17</sup> NTSB Safety Recommendation, File Nos. M-99-24 and 25 (Feb. 17, 2000).

not provide Internet access. Thus, most of this critical information is sent via the postal service, depriving vessel operators the most current available information.

Real-time provision of these data would be available to ESVs via VSATs. In addition, with this technology, vessel operators would have the communications resources to immediately alert the Coast Guard or Army Corps of safety hazards or potential weather problems. These features are especially critical during an emergency affecting life or property. For example, current radios typically do not deliver messages in real time, frequently requiring a vessel to turn around on the river to pick up or deliver cargo or personnel. This safety hazard would be avoided with a VSAT network because messages immediately are delivered to the vessels.

### SPECIFIC RULE PROPOSALS

SOI supports the Commission's proposals for amending the Table of Frequency Allocations and Part 25 of its rules to permit blanket licensing of ESVs in the Ku-band.<sup>18</sup> Certain of the issues raised in the NPRM require specific comment:

- **Protection of mobile ESVs** - SOI supports authorizing ESVs to operate on a primary basis in the Ku-band so that they would be equal in priority to other applications in the band.<sup>19</sup> It opposes any action to categorize Ku-band operation of ESVs on a secondary basis. Viable safeguards exist, such as SOI's transmit mute technology, to protect against harmful interference. Data from SOI's test operations under STA corroborate this position. However, SOI agrees with the Commission's suggestion that ESVs in motion shall not claim protection from other terrestrial users of the band.<sup>20</sup> Implementing such protection would be extremely difficult to enforce.

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<sup>18</sup> NPRM at ¶¶24-25. The Commission also proposes blanket licensing for ESVs in the C-band. *Id.* at ¶24. Given the greater potential for harmful interference from ESV operations in the C-band, the Commission proposes more stringent interference protection and other operating conditions for license grant. *Id.* at ¶¶43-46. SOI takes no position on the Commission's proposals for C-band ESV operation. However, SOI urges the Commission to adopt Ku-band ESV licensing regardless of what action it takes with respect to C-band licensing.

<sup>19</sup> NPRM at ¶30.

<sup>20</sup> The same position is taken in Annex I to Resolution 902 at WRC-03. NPRM at ¶32

- **NTIA Coordination** - The Commission proposes that applications for Ku-band ESVs must be coordinated through the National Telecommunications and Information Administration ("NTIA") Interdepartment Radio Advisory Committee ("IRAC") before license grant.<sup>21</sup> SOI does not oppose this pre-licensing requirement provided that procedures are established to expedite such coordination.
- **Limits on ESV Antenna Elevation** - The Commission seeks comment on whether to limit ESV antenna elevation to a specified minimum value.<sup>22</sup> To protect against incidents of harmful interference, SOI recommends that the minimum value for ESV antennas should be at least 15 degrees.
- **Adjacent Satellite Interference** – The Commission solicits comment on what method(s) Ku-band ESV operators should use to prevent adjacent satellite interference caused by in-motion ESVs.<sup>23</sup> As detailed above, SOI would use transmit mute technology to ensure that adjacent satellite interference is not caused by in-motion ESVs. This technology has been deployed successfully in other satellite operations worldwide. For example, transmit mute technology is used in numerous maritime operations, including on drilling rigs and seismic exploration vessels.
- **Tonnage Limit** – The Commission seeks comment on whether it should limit ESV operators to vessels that are 300 gross tons or larger.<sup>24</sup> The rationale for this limit is to restrict the number of vessels operating near existing terrestrial Ku-band operations.<sup>25</sup> SOI opposes this proposal because the transmit mute technology makes any such limit unnecessary for managing interference and because this proposal would artificially limit the number of vessels eligible to use the ESV technology.
- **Automatic Shut-Down** – The Commission proposes that ESV systems must be equipped with automatic mechanisms to terminate transmissions whenever the station operates outside its authorized geographic area or operational limits.<sup>26</sup> SOI opposes this proposal. Technically, it would be quite difficult and costly to implement. Further, availability of the transmit mute technology obviates the need for such a requirement.
- **Satellite Carriers** – The Commission seeks comment on whether it should authorize Ku-band ESV licensees to operate with any U.S.-licensed satellite (ALSAT authority) and with any non-U.S. satellites on the Permitted List using appropriate parameters or whether ESV operators

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<sup>21</sup> *Id.* at ¶34.

<sup>22</sup> *Id.* at ¶47.

<sup>23</sup> *Id.* at ¶53.

<sup>24</sup> *Id.* at ¶54.

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

should be granted authority to access individual satellites only.<sup>27</sup> SOI supports granting ESV licensees maximum flexibility to select the satellite used for the network (i.e., designating ALSAT) instead of requiring designation of specific individual satellites. Availability of transmit mute and other interference protection mechanisms makes it unreasonable to limit ESV licenses to only individual satellites.

- **Bandwidth** – The Commission seeks comment on whether it should impose a 2.4 MHz bandwidth limit for Ku-band ESV operations.<sup>28</sup> SOI does not oppose a 2.4 MHz bandwidth. However, since this bandwidth would represent a considerable bit rate from the standard 1.2 meter ESV antenna, appropriate power density limits also should be imposed if this bandwidth is allowed.

## CONCLUSION

SOI has shown herein that the public interest justifies adoption of the proposed rules. The public clearly would benefit. Communications capabilities to improve protection of domestic security and public safety would become accessible. Sophisticated, high-speed broadband voice and data services would become available. Efficient spectrum usage would be promoted. Operations by incumbent and future Ku-band licensees would not be compromised because VSAT services can be provided for ESVs used by vessel operators on a strictly non-interfering basis.

National policy compels granting the proposed NPRM. Vessel operators would have the tools to support protection of domestic security. Congress' goal of making the ports and waterways safe would be promoted. Any delay in allowing SOI or other operators to make this technology available on vessels would deprive the public of these benefits.

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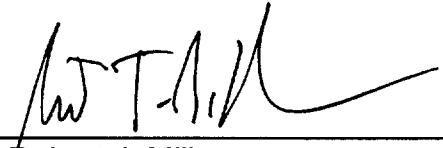
<sup>27</sup> *Id.* at ¶53.

<sup>28</sup> *Id.* at ¶16

WHEREFORE, for the foregoing reasons, Schlumberger Omnes, Inc. hereby requests that the Commission grant the rules proposed in the NPRM except as otherwise set forth herein.

Respectfully submitted,

SCHLUMBERGER OMNES, INC.

By:   
Robert J. Miller

Gardere Wynne Sewell LLP  
3000 Thanksgiving Tower  
1601 Elm Street  
Dallas, Texas 75201-4761  
Telephone: (214) 999-4219  
Telecopier: (214) 999-3219

Its Attorney

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